11th.—N. 44° 39′, W. 45° 42′, large berg; N. 43° 48′, W. 48° 17′, large berg; N. 42° 25′, W. 51° 01′, large berg; N. 42° 54′, W. 48° 58′, very large berg; N. 47° 39′, W. 47° 47′, small quantity of broken field ice and two small bergs.

11–12th.—N. 45°, W. 48° to N. 43°, W. 49°, an immense field of ice and twenty bergs.

12th.—N. 43° 14′, W. 48° 40′, high berg; N. 42° 52′, W. 48° 44′, large berg; N. 46° 02′, W. 45° 40′, small berg; N. 44° 30′, W. 48° 36′, very large berg and field ice; N. 44°, W. 49° 25′, field ice; N. 43° 50′, W. 49° 30′, field ice; N. 44° 36′, W. 46° 52′, three bergs; N. 44° 26′, W. 47° 30′, seventeen bergs; N. 44° 19′, W. 48° 02′ to N. 44° 10′, W. 49° 19′, six bergs and ice field; N. 43° 07′, W. 41° 55′, two bergs.

13th.—N. 45° 04′, W. 45° 32′, thirty-five bergs between 6.30 a. m. and 1 p. m.; N. 43° 49′, W. 47° 50′, berg about 180 feet high and 1,000 feet long; N. 43° 33′, W. 48° 17′ to N. 43° 21′, W. 48° 39′, fields of thin broken ice; N. 45° 11′, W. 46° 58′ to N. 44° 43′, W. 48° 54′, thirty-five bergs and small pieces; N. 45°, W. 45°, two large bergs; N. 46° 10′, W. 45° 20′ to N. 44° 40′, W. 49°, many large and small bergs, heavy pack and field ice; N. 43° 20′, W. 48° 46′, berg.

13–14th.—N. 43° 45′, W. 48° 26′ to N. 43° 22′, W. 49° 12′, three large bergs and field ice to the north.

14th.—N. 45° 29′, W. 44° 39′, two bergs; N. 45° 07′, W. 45° 12′, small berg; N. 44° 30′, W. 35° 30′, twenty bergs; N. 43° 38′, W. 46°, large berg; N. 44° 10′, W. 48° 20′, two bergs.

14–15th.—N. 45° 20′, W. 44° 50′ to N. 43° 08′, W. 49°, 12′, several bergs, and on extreme southern edge of the Grand Banks passed field ice for three and one-half hours.

15th.—N. 43° 11′, W. 49° 18′, berg and small floe of ice; N. 43°, W. 49° to N. 42° 58′, W. 49° 30′, two bergs and field ice; N. 47° 36′, W. 41° 53′, small berg; N. 41° 12′, W. 50° 12′, two large bergs and field ice; N. 43°, W. 48° 30′, two bergs.

16th.—N. 46°, W. 45° 50′, four bergs and patches of field ice; N. 45° 40′, W. 46° 07′ to N. 45° 04′, W. 48°, large and small bergs, and from 3 p. m. to 5.30 p. m., several large ice fields; N. 44° 46′, W. 43° 49′, large berg.

17th.—N. 43° 08′, W. 48° 43′ to N. 42° 54′, W. 49° 18′, two bergs; N. 42° 24′, W. 42° 45′, two bergs; N. 47°, W. 41°, berg.

19th.—N. 45° 07′, W. 41° 55′, two bergs 30 feet high; N. 43°, W. 41° 30′, four large bergs; N. 47° 20′, W. 44° 30′, small berg; N. 44° 56′, W. 42° 13′, small bergs.

20th.—N. 45° 40′, W. 48°, several large bergs.

22d.—N. 44° 40′, W. 48° 20′, large and small bergs; and in N. 44° 37′, W. 48° 20′ to N. 44° 18′, W. 49° 22′, field ice; N. 44° 24′, W. 44° 05′, berg with two peaks about 60 feet high; N. 46° 30′, W. 46° 44′, vast ice floe; steamed through it for 18 hours, during which sighted 30 bergs, several very large.

23d.—N. 43° 20′, W. 48° 40′, field-ice for fifty miles; N. 43° 15′, W. 52° 05′, field-ice; N. 44° 11′, W. 48° 13′ to N. 44° 51′, W. 50° 06′, medium sized berg and field ice; N. 42° 52′, W. 49° 01′, two bergs; N. 42° 45′, W. 50°, ice field and large berg.

24th.—N. 43° 37′, W. 48° 31′, large berg; N. 43° 33′, W. 49° 01′, three bergs and patches of field ice; N. 42° 47′, W. 49° 23′, small berg; N. 44° 23′, W. 48° 45′, quantity of ice; N. 45° 16′, W. 45° 10′, two bergs.

25th.—N. 42° 35′, W. 49° 40′, broken field ice and two bergs; N. 42° 20′, W. 50° 35′, large ice floe, large bergs.

27th.—N. 43° 19′, W. 48° 12′, small berg and field ice; N. 42° 33′, W. 50°, two moderate sized bergs; N. 43° 45′, W. 48° 17′ to N. 42° 42′, W. 49° 30′, detached ice, one small berg and two large ones; N. 43° 19′, W. 48° 12′ to N. 42° 32′, W. 50° 18′, field ice, one small and two moderate sized bergs; N. 43′ 05′, W. 48° 40′ to N. 43° 05′, W. 48° 50′, small bergs, large quantities of field ice; N. 45° 16′, W. 45° 10′ to N. 45° W. 45° 50′, berg about one hundred and thirty feet high, and small berg; N. 43°, W. 49° 10′ to N. 42°, W. 50°, several bergs, field ice.

28th.—N. 43° 17′, W. 48° 12′ to N. 43° 32′, W. 50° 18′, large quantities of detatched field ice and two bergs; N. 43° 09′, W. 49° 08′ to N. 42° 40′, W. 50° 20′, field ice and two bergs four hundred feet long and sixty feet high; N. 42° 36′, W. 50° 20′, field ice; N. 45° 50′, W. 47° 40′, heavy pack ice; N. 45° 14′, W. 47° 22′, berg one hundred feet high and two hundred feet long; N. 44° 35′, W. 48° 30′, packed field ice.

28th–March 2d.—Light slab ice from Halifax to N. 44° 40′ W. 60°; N. 44° 45′, W. 59° 10′ to N. 45° 08′, W. 57° 43′, heavy Gulf field ice; N. 45° 35′, W. 55° 15′, rotten field ice.

## FOG IN FEBRUARY.

The limits of fog-belts west of the fortieth meridian are shown on chart i by dotted shading. In the vicinity of the Banks of Newfoundland fog was reported on thirteen dates; between the fifty-fifth and sixty-fifth meridians on six dates; and west of the sixty-fifth meridian on five dates. Compared with the corresponding month of the last two years the dates of occurrence of fog near the Grand Banks were two less than the average; between the fifty-fifth and sixty-fifth meridians the same as the average; and west of the sixty-fifth meridian two less than the average. In each instance fog was reported in the regions referred to attending the approach or passage to the northward of low pressure storms. On the 25th dense fog prevailed along the Atlantic coast from Portland, Me., to Norfolk, Va., attending the advance eastward of an area of low pressure to the lower lake region. The fog on Long Island Sound was so dense as to seriously interrupt navigation, and all Sound steamers were twelve to eighteen hours late at New London, Conn. On the 26th dense fog prevailed on the New England coast south of Boston, Mass., attending the approach and passage over New England and the ocean to the eastward of a low pressure storm. On the 28th dense fog prevailed along the Atlantic coast from southern New England to Norfolk, Va., with the passage of a low pressure storm over the lower lake region and the Saint Lawrence Valley. Dense fog prevailed at New London, Conn., on the 3d, attending the passage of an area of low pressure over the Saint Lawrence Valley, and a number of vessels took refuge in that port on account of the dense fog.

The following are limits of fog-areas on the north Atlantic Ocean, west of the fortieth meridian, for February, 1890, as reported by shipmasters:

| Date. | Entered. | | Cleared. | | Date. | Entered. | | Cleared. | |
|---|---|---|---|---|---|---|---|---|---|
| | Lat. N. | Lon. W. | Lat. N. | Lon. W. | | Lat. N. | Lon. W. | Lat. N. | Lon. W. |
| | ° ′ | ° ′ | ° ′ | ° ′ | | ° ′ | ° ′ | ° ′ | ° ′ |
| 1 | 43 28 | 49 02 | 43 24 | 49 25 | 20 | 41 53 | 59 08 | 41 47 | 59 38 |
| 1 | 42 26 | 53 39 | 42 50 | 49 10 | 21–22 | 44 20 | 38 00 | 43 15 | 45 01 |
| 3 | 41 10 | 65 40 | 41 13 | 65 20 | 25 | 40 13 | 63 05 | 40 05 | 64 30 |
| 3 | 40 36 | 68 30 | 40 32 | 70 40 | 25 | 42 24 | 61 38 | 40 20 | 72 09 |
| 3 | 43 52 | 50 13 | 43 50 | 50 48 | 25 | 40 41 | 70 09 | Off Sandy Hook. | |
| 4 | 43 47 | 52 42 | 43 46 | 53 12 | 25 | 35 52 | 74 52 | 41 06 | 71 25 |
| 4 | 44 13 | 48 35 | 43 01 | 50 47 | 26 | 39 57 | 66 00 | 39 30 | 71 20 |
| 4 | 45 40 | 46 30 | 45 00 | 47 20 | 26 | 42 20 | 51 15 | 42 02 | 53 19 |
| 5 | 43 04 | 61 00 | 42 58 | 61 59 | 26–27 | 42 40 | 48 20 | 41 38 | 54 30 |
| 5 | 41 41 | 49 43 | 41 45 | 49 23 | 26–27 | 41 02 | 63 04 | 40 56 | 64 09 |
| 6 | 42 30 | 59 50 | 43 51 | 60 39 | 26–27 | 45 10 | 44 20 | 43 15 | 48 40 |
| 6 | 43 03 | 50 05 | 43 00 | 51 10 | 27 | 41 40 | 48 42 | 41 14 | 50 59 |
| 6 | 42 50 | 49 00 | 42 50 | 48 20 | 27 | 44 58 | 45 26 | 42 42 | 50 05 |
| 8 | 42 30 | 69 25 | Off Minots. | | 27 | 43 47 | 47 44 | 43 36 | 49 54 |
| 13 | 43 38 | 51 10 | 43 34 | 51 31 | 27–28 | 43 56 | 47 43 | 42 11 | 50 45 |
| 16 | 45 17 | 47 38 | 44 50 | 48 50 | 28 | 38 55 | 71 54 | 38 13 | 73 26 |
| 19 | 42 48 | 51 17 | 42 46 | 51 30 | | | | | |

## TEMPERATURE OF THE AIR (expressed in degrees, Fahrenheit).

The distribution of mean temperature over the United States and Canada for February, 1890, is exhibited on chart ii by dotted isotherms. In the table of miscellaneous meteorological data the monthly mean temperature and the departure from the normal are given for regular stations of the Signal Service. The figures opposite the names of the geographical dis-

tricts in the columns for mean temperature and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the departure is below the normal and subtracting when above. The monthly mean temperature for regular stations of the Signal Service represents the mean of the maximum and minimum temperatures.

For February, 1890, the mean temperature was highest over southern Florida, where the mean values rose to 73°.3 at Key West. In Florida south of the thirtieth parallel, in extreme southern Louisiana, and in the lower Rio Grande valley the mean readings were above 65°, and south of a line traced irregularly south of west from the middle Virginia coast to extreme western Texas, and south and west of a line traced from south-central Arizona northwestward to a point on the Pacific coast just south of San Francisco, Cal., the mean temperature was above 50°. The mean temperature was lowest in Manitoba, where it fell below —5°, the lowest mean reading, —9°, being noted at Minnedosa. In extreme northwestern Minnesota, northern North Dakota, and extreme northeastern Montana the mean readings were below zero. North of a line traced from the west-central coast of the Gulf of Saint Lawrence westward to central South Dakota, and thence westnorthwest to Montana, and at the more elevated stations in west-central Colorado the mean temperature fell to, or below, 15°. A line indicating the southern limit of monthly mean temperature of 20° is traced somewhat to the southward, and follows the same general direction, of the line of 15° referred to, and the mean temperature also fell to 20° in east-central Nevada. North of a line traced from the coast of northern Massachusetts westward to central lower Michigan, thence south of west to north-central Colorado, thence southward to north-central New Mexico, and generally over the middle and northern plateau the mean temperature was below 30°. On the Pacific coast the mean temperature varied from 55° in extreme southern California to 35° in extreme northwestern Washington.

The mean temperature for February was above the normal, except from the Dakotas westward to the Pacific coast, and thence southward over Washington, Oregon, California, and western Nevada to extreme southern California, where at San Diego the month was slightly warmer than usual. It was also slightly below the normal in central Arizona. In areas east of the Rocky Mountains the departures above the normal temperature varied from 5° to 9°, and in north-central Montana and the British Possessions to the northward the departures below the normal temperature were more than 10°.

The following are some of the most marked departures from the normal at the older established Signal Service stations:

| Above normal. | ° | Below normal. | ° |
|---|---|---|---|
| Hatteras, N. C | 9.4 | Fort Assinniboine, Mont | 11.2 |
| Pittsburgh, Pa | 8.0 | Spokane Falls, Wash | 4.6 |
| Chattanooga, Tenn | 8.0 | Fort Canby, Wash | 3.2 |
| Milwaukee, Wis | 7.0 | Red Bluff, Cal | 4.0 |
| Galveston, Tex | 5.7 | San Carlos, Ariz | 1.6 |

In the Atlantic coast and Gulf states and in the Ohio Valley and Tennessee, the current month was the warmest February ever reported by regular stations of the Signal Service. At Boston, Mass., the mean temperature for the current month was 0°.7 higher than the highest previous mean temperature for February, noted in 1877; at Block Island, R. I., 2°.5; at Lynchburgh, Va., 1°.5; at Vicksburg, Miss., 0°.8; at Shreveport, La., 0°.1; at Galveston, Tex., 0°.6; at San Antonio, Tex., 0°.1; and at Pittsburgh, Pa., 2°.2 above mean of 1882; at New Haven, Conn., 0°.3; at New London, Conn., 2°.4; at New York City, 4°.1; and at Cape Henry, Va., 4°.1 above mean of 1880; at Philadelphia, Pa., 1°.1; at Baltimore, Md., 1°.2; at Washington City, 2°.5; at Norfolk, Va., 1°.3; at Charlotte, N. C., 1°.5; at Hatteras, N. C., 2°.4; at Kitty Hawk, N. C., 3°.5; at Wilmington, N. C., 1°.9; and at Charleston, S. C., 1°.9 above mean of 1884; at Atlantic City, N. J., 3°.3 above mean of 1880 and 1882; at Augusta, Ga., 1°.5 above mean of 1883; at Savannah, Ga., 2°.5; at Jacksonville, Fla., 0°.4; at Atlanta, Ga., 2°.1; at Montgomery, Ala., 0°.5; at Fort Smith, Ark., 2°.9; at Chattanooga, Tenn., 2°.8, and at Knoxville, Tenn., 2°.2 above mean of 1887. No unprecedentedly low mean temperatures were reported at regular stations of the Signal Service for the current month.

The continued excess in temperature in the southeastern states and along a greater part of the Atlantic coast from December, 1889, to February, 1890, inclusive, while marking the winter of 1889–'90 as the warmest in the history of the Signal Service over a greater portion of the country east of the Mississippi River, was in marked contrast to the continued deficiency in temperature on the Pacific coast and in the northwestern states and territories, where the weather was cooler than usual, and the lowest December mean temperature ever reported for that station was noted at San Diego, Cal., in December, 1889; where the temperature was the lowest ever reported for January at stations in northern Nevada, northern Montana, and California in January, 1890, and where the mean temperature was below the normal in February, 1890.

## DEVIATIONS FROM NORMAL TEMPERATURES.

The following table shows for certain stations, as reported by voluntary observers, (1) the normal temperature for February for a series of years; (2) the length of record during which the observations have been taken, and from which the normal has been computed; (3) the mean temperature for February, 1890; (4) the departure of the current month from the normal; (5) and the extreme monthly means for February, during the period of observation and the years of occurrence:

| State and station. | County. | (1) Normal for the month of Feb. | (2) Length of record. | (3) Mean for Feb., 1890. | (4) Departure from normal. | (5) Extreme monthly mean temperature for Feb. | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Highest. | Year. | Lowest. | Year. |
| *Arkansas.* | | ° | *Years* | ° | ° | | | ° | |
| Lead Hill | Boone | 39.3 | 8 | 44.3 | + 5.0 | 49.9 | 1882 | 32.2 | 1885 |
| *California.* | | | | | | | | | |
| Sacramento | Sacramento | 50.3 | 34 | 43.3 | — 7.0 | 55.0 | 1877, '79 | 43.3 | 1890 |
| *Connecticut.* | | | | | | | | | |
| Middletown | Middlesex | 26.5 | 22 | 34.2 | + 7.7 | 34.5 | 1867 | 17.7 | 1885 |
| *Florida.* | | | | | | | | | |
| Merritt's Island | Brevard | 63.3 | 7 | 68.3 | + 5.0 | 69.4 | 1887 | 58.0 | 1889 |
| *Georgia.* | | | | | | | | | |
| Forsyth | Monroe | 51.6 | 16 | 59.6 | + 8.0 | 59.6 | 1890 | 44.5 | 1885 |
| *Illinois.* | | | | | | | | | |
| Peoria | Peoria | 29.2 | 34 | 35.7 | + 6.5 | 39.3 | 1882 | 15.5 | 1875 |
| Riley | McHenry | 22.1 | 34 | 28.5 | + 6.4 | 32.4 | 1882 | 4.7 | 1875 |
| *Indiana.* | | | | | | | | | |
| Vevay | Switzerland | 35.6 | 23 | 44.2 | + 8.6 | 45.5 | 1882 | 25.1 | 1885 |
| *Iowa.* | | | | | | | | | |
| Cresco | Howard | 15.3 | 18 | 21.0 | + 5.7 | 31.3 | 1878 | 1.0 | 1875 |
| Monticello | Jones | 21.3 | 37 | 27.3 | + 6.0 | 34.6 | 1878 | 7.5 | 1875 |
| Logan | Harrison | 23.9 | 16 | 26.5 | + 2.6 | 35.2 | 1877 | 12.6 | 1875 |
| *Kansas.* | | | | | | | | | |
| Lawrence | Douglas | 32.0 | 26 | 32.6 | + 0.6 | 41.6 | 1882 | 20.8 | 1885 |
| Wellington | Sumner | 32.0 | 11 | 35.8 | + 3.8 | 40.1 | 1882 | 24.6 | 1885 |
| *Louisiana.* | | | | | | | | | |
| Grand Coteau | Saint Landry | 58.2 | 7 | 64.5 | + 6.3 | 64.6 | 1887 | 52.4 | 1885 |
| *Maine.* | | | | | | | | | |
| Gardiner | Kennebec | 20.9 | 49 | 24.9 | + 4.0 | 28.7 | 1840 | 13.3 | 1838 |
| *Maryland.* | | | | | | | | | |
| Cumberland | Allegany | 30.9 | 31 | 40.0 | + 9.1 | 40.0 | 1890 | 19.4 | 1868 |
| *Massachusetts.* | | | | | | | | | |
| Amherst | Hampshire | 24.7 | 54 | 32.4 | + 7.7 | 32.4 | 1890 | 16.5 | 1843 |
| Newburyport | Essex | 26.3 | 10 | 31.3 | + 5.0 | 31.3 | 1890 | 19.3 | 1885 |
| Somerset | Bristol | 27.7 | 17 | 35.3 | + 7.6 | 35.3 | 1890 | 19.6 | 1885 |
| *Michigan.* | | | | | | | | | |
| Kalamazoo | Kalamazoo | 25.0 | 14 | 34.0 | + 9.0 | 35.0 | 1882 | 11.2 | 1885 |
| Thornville | Lapeer | 24.0 | 13 | 31.4 | + 7.4 | 34.8 | 1882 | 10.6 | 1885 |
| *Minnesota.* | | | | | | | | | |
| Minneapolis | Hennepin | 14.0 | 25 | 17.5 | + 3.5 | 29.9 | 1877 | — 2.6 | 1875 |
| *Montana.* | | | | | | | | | |
| Fort Shaw | Lewis & Clarke | 25.6 | 20 | 14.2 | —11.4 | 39.6 | 1877 | 2.4 | 1887 |
| *New Hampshire.* | | | | | | | | | |
| Hanover | Grafton | 18.5 | 53 | 25.4 | + 6.9 | 27.2 | 1840 | 10.8 | 1885 |
| *New Jersey.* | | | | | | | | | |
| Moorestown | Burlington | 31.1 | 26 | 39.4 | + 8.3 | 39.4 | 1890 | 21.6 | 1885 |
| South Orange | Essex | 29.4 | 19 | 37.0 | + 7.6 | 37.0 | 1890 | 22.8 | 1885 |
| *New York.* | | | | | | | | | |
| Cooperstown | Otsego | 20.9 | 36 | 29.2 | + 8.3 | 31.7 | 1857 | 10.5 | 1885 |
| Palermo | Oswego | 21.5 | 36 | 27.5 | + 6.0 | 27.8 | 1859 | 9.8 | 1885 |
| *North Carolina.* | | | | | | | | | |
| Lenoir | Caldwell | 39.7 | 17 | 49.0 | + 9.3 | 49.0 | 1890 | 30.3 | 1875 |
| *Ohio.* | | | | | | | | | |
| N'th Lewisburgh | Champaign | 30.0 | 58 | 39.4 | + 9.4 | 42.0 | 1851 | 19.0 | * |
| Wauseon | Fulton | 25.2 | 20 | 33.3 | + 8.1 | 35.4 | 1882 | 11.3 | 1875 |

*Deviations from normal temperatures*—Continued.

| State and station. | County. | (1) Normal for the month of Feb. | (2) Length of record. | (3) Mean for Feb., 1890. | (4) Departure from normal. | (5) Extreme monthly mean temperature for Feb. | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Highest. | Year. | Lowest. | Year. |
| *Oregon.* | | ° | Years | ° | ° | ° | | ° | |
| Albany | Linn | 40.8 | 11 | 38.7 | — 2.1 | 47.9 | 1885 | 32.7 | 1887 |
| Eola | Polk | 39.9 | 19 | 37.0 | — 2.9 | 46.5 | 1885 | 31.0 | 1887 |
| *Pennsylvania.* | | | | | | | | | |
| Dyberry | Wayne | 22.0 | 25 | 30.1 | + 8.1 | 30.1 | 1890 | 13.3 | 1868 |
| Grampian Hills | Clearfield | 24.4 | 25 | 33.8 | + 9.4 | 33.8 | 1890 | 13.7 | 1885 |
| Wellsborough | Tioga | 25.7 | 10 | 34.0 | + 8.3 | 34.0 | 1890 | 16.7 | 1885 |
| *South Carolina.* | | | | | | | | | |
| Statesburgh | Sumter | 49.3 | 9 | 56.6 | + 7.3 | 56.6 | 1890 | 41.8 | 1885 |
| *Tennessee.* | | | | | | | | | |
| Austin | Wilson | 42.8 | 21 | 51.4 | + 8.6 | 51.4 | 1890 | 32.9 | 1885 |
| Milan | Gibson | 39.8 | 6 | 48.2 | + 8.4 | 48.2 | 1890 | 33.8 | 1885 |
| *Texas.* | | | | | | | | | |
| New Ulm | Austin | 56.1 | 16 | 61.0 | + 4.9 | 62.0 | 1882 | 52.6 | 1883 |
| *Vermont.* | | | | | | | | | |
| Strafford | Orange | 18.0 | 16 | 22.1 | + 4.1 | 25.7 | 1877 | 11.0 | 1885 |
| *Virginia.* | | | | | | | | | |
| Birdsnest | Northampt'n | 40.8 | 21 | 50.2 | + 9.4 | 50.2 | 1890 | 33.9 | 1889 |
| *Wisconsin.* | | | | | | | | | |
| Madison | Dane | 20.6 | 23 | 26.1 | + 5.5 | 32.8 | 1878 | 8.1 | 1885 |
| *Washington.* | | | | | | | | | |
| Fort Townsend | Jefferson | 40.7 | 18 | 34.8 | — 5.9 | 47.0 | 1885 | 31.7 | 1887 |

*1838, 1856, 1875.

The above table shows that the mean temperature for the current month was the highest mean temperature ever reported for February at the following-named stations during their respective periods of observation: Forsyth, Ga., 1°.5 above mean of 1883; Cumberland, Md., 2°.0 above mean of 1877; Amherst, Mass., 1°.0 above mean of 1857; Newburyport, Mass., 0°.8 above mean of 1880 and 1884; Somerset, Mass., 1°.8 above mean of 1884; Moorestown, N. J. (broken record), 2°.7 above mean of 1880; South Orange, N. J., 2°.7 above mean of 1877; Lenoir, N. C., 2°.5 above mean of 1887; Dyberry, Pa., 1°.0 above mean of 1867; Grampian Hills, Pa., 1°.8 above mean of 1882; Wellsborough, Pa., 1°.6 above mean of 1882; Statesburgh, S. C., 1°.5 above mean of 1884; Austin, Tenn., 0°.3 above mean of 1882; Milan, Tenn., 0°.2 above mean of 1887; and Birdsnest, Va., 2°.4 above mean of 1880. At Sacramento, Cal., the mean temperature reported for the current month was 0°.4 lower than the lowest mean temperature previously reported for February, noted in 1887.

## MAXIMUM AND MINIMUM TEMPERATURES.

The highest temperature reported by a regular station of the Signal Service was 95°, at Rio Grande City, Tex., on the 24th, and the temperature rose to 90° at Micco, Fla., on the 28th. Maximum temperatures of 80° or above were reported in the eastern part of the south Atlantic and the southern part of the Gulf States, except along the immediate Atlantic and Gulf coasts where they generally fell below 80°, and the maximum values rose above 80° over a greater part of Texas, in the central and southern part of Indian Territory, and within an area extending from the lower Gila valley, Ariz., over southeastern California to the Pacific coast near Los Angeles, Cal. The lowest maximum temperature reported was 38°, at Saint Vincent, Minn., and the maximum readings were below 50° in extreme eastern Maine, and north of a line traced from northern lower Michigan westward to central Wisconsin, thence northwest to northeastern Minnesota, thence southwest to northeastern South Dakota, and thence northwestward over northeastern Montana. The reports of United States Army post surgeons and state weather service and voluntary observers show the following maximum temperatures in states and territories where the temperature was reported 80° or above: Cameron, La., 101°; Cactus, Cal., and Fort Ringgold, Tex., 99°; San Simon, Ariz., 96°; Gove City, Kans, 92°; Alva, Fla., 91°; Vaiden, Miss., and Pellville, Ky., 87°; Louisville and Millen, Ga., and Fort Selden, N. Mex., 85°; Citronelle and Wiggins, Ala., and Hardeeville, S. C., 83°; Lead Hill, Ark., Caddo Creek, Ind. T., Willow Springs, Mo., Washington and Winslow, N. C., 81°; Lamar and Las Animas, Colo., Hasson, Ohio, Richmond and Smithfield, Va., 80°. At a number of the older established Signal Service stations in New England, the middle Atlantic, south Atlantic, and Gulf states, the Rio Grande Valley, Tennessee, the Lake region, the upper Mississippi and Missouri valleys, along the eastern slope of the Rocky Mountains, and in the southern plateau region the maximum temperatures for the current month were as high or higher than previously reported for February. The greatest excesses in temperature in the several districts over the highest previous temperature reported for February were, Block Island, R. I., 4° above maximum of 1887, and New London, Conn., 3° above maximum of 1880; Albany, N. Y., 2° above maximum of 1880; at New York City and Lynchburgh, Va., the maximum temperature was the same as that of 1874, and at Atlantic City, N. J., and Cape Henry, Va., the maximum was the same as that of 1880; Charlotte, N. C., 3° above maximum of 1883, and Southport, N. C., 3° above maximum of 1880; Atlanta, Ga., 1° above maximum of 1889; Fort Smith and Little Rock, Ark., the same as maximum of 1883 and 1889, respectively; Galvestou, Tex., the same as maximum of 1887; Brownsville, Tex., 1° above maximum of 1889; Chattanooga, Tenn., 4° above maximum of 1887; Rochester, N. Y., 2° above maximum of 1875, and Toledo, Ohio, 2° above maximum of 1883; Port Huron, Mich., 1° above maximum of 1880; Saint Louis, Mo., 4° above maximum of 1887; North Platte, Nebr., 1° above maximum of 1882; Denver, Colo., 5° above maximum of 1879; Fort Sill, Ind. T., and Fort Stanton, N. Mex., 4° and 9°, respectively, above the highest February maximum reported for two or more preceding years; Fort Thomas, Ariz., 5° above February maximum of two or more preceding years; Montrose, Colo., 3° above maximum of 1887. The years of occurrence of the maximum temperature for February in the several districts have been irregular.

The lowest temperature reported by a regular station of the Signal Service was —43°, at Fort Buford, N. Dak., and Fort Maginnis, Mont., on the 26th. The minimum temperature was below —30° in extreme northwestern Minnesota, and north of a line traced thence southwestward to northwestern South Dakota, thence westward over northern Wyoming, and thence northward over western Montana. North of a line traced from north-central Minnesota southwestward to extreme northern Colorado, and thence northwestward to eastern Washington, and in an area in north-central Nevada the minimum temperature fell below —20°. Zero temperatures were reported in New England north of Massachusetts, and north of a line traced from extreme northern lower Michigan southwestward to southwestern Missouri, and thence westward to extreme east-central California, and thence northward over central Oregon and Washington. The highest minimum temperature reported was 65°, at Key West, Fla.; the minimum temperatures were above 40° in the Florida Peninsula and extreme southern Louisiana, and were above 32° (the freezing point) along the immediate south Atlantic coast south of Kitty Hawk, N. C., over the southern parts of the Gulf States east of Galveston, Tex., in the extreme lower Rio Grande valley, along the California coast south of the thirty-ninth parallel, and over southern California and southwestern Arizona. The reports of United States Army post surgeons, state weather services, and voluntary observers, show the following minimum temperatures in states and territories where the temperature fell to, or below, zero: Camp Poplar River, Mont., and Fort Pembina, N. Dak., —46°; Pokegama Falls, Minn., —36°; Scranton, S. Dak., —33°; Fort D. A. Russell, Wyo., —31°; Soda Springs, Idaho, and Fort Niobrara, Nebr., —29°; Breckenridge, Colo., —27°; Boca, Cal., and Elko, Nev., —26°; Larrabee, Iowa, and Jordan Valley, Oregon, —24; West Milan, N. H., Mount Pleasant and Nephi, Utah, —20°; Madison Barracks, N. Y., —19°; Greenwood and Neillsville, Wis., —18°; Chama, N. Mex., —17°; Fairfield, Me., and Fort Brady, Mich., —16°; Scott City, Kans., —14°; Conception, Mo., Lunenburgh and Strafford, Vt., —8°; Groton (1), Mass., and Blue Knob, Pa., —7°; Winslow, Ark., —4°;

New Hartford (1), Conn., and Ochiltree, Tex., —3; and Fort Sheridan, Ill., —2°.

At a number of the regular stations of the Signal Service in the extreme northwest, on the northeastern and middle-eastern slopes of the Rocky Mountains, in the plateau regions, and on the north Pacific coast the minimum temperature for the current month was as low or lower than reported for February of preceding years, and at Hamilton, Bermuda, the temperature fell to 49° on the 24th, the lowest point reached in many years. The following are some of the most marked departures below the lowest previous February temperature: Fort Buford, N. Dak., 12 years record, 2° below minimum of 1887; Fort Sully, N. Dak., 13 years record, the same as minimum of 1875; Fort Maginnis, Mont., 8 years record, 1° below minimum of 1888; Lava, N. Mex., 6 years record, 1° below minimum of 1885; Keeler, Cal., 5 years record, 2° below minimum of 1889; Winnemucca, Nev., 12 years record, 2° below minimum of 1883; Montrose, Colo., 6 years record, 7° below minimum of 1889; Walla Walla, Wash., 5 years record, 4° below minimum of 1887, and Astoria, Oregon, 5 years record, 9° below minimum of 1889. The lowest temperature reported for February in preceding years was generally noted in New England, in the Atlantic coast states south of Pennsylvania, in the Florida Peninsula, and the east Gulf states in 1886 or 1889; in the lower lake region in 1875 or 1885; in the upper lake region in 1875; in the extreme northwest in 1887 or 1888; on the eastern slope of the Rocky Mountains in 1883; in the middle plateau region in 1889; and on the middle Pacific coast in 1884 or 1887; elsewhere the periods of occurrence were irregular. Among extremely low temperatures reported in the several districts for February of preceding years are: —32° at Northfield, Vt., in 1889; —18° at Albany, N. Y., in 1875; —2° at Washington City, in 1886; —10° at Morgantown, W. Va., in 1875; 5° at Kitty Hawk and 6° at Charlotte, N. C., in 1886; 26° at Cedar Keys, Fla., in 1886; 8° at Atlanta, Ga., in 1885; 1° at Fort Smith, Ark., in 1885; —11° at Columbus, Ohio, in 1885; —20° at Detroit, Mich., in 1875; —34° at Duluth, Minn., in 1875; —50° at Saint Vincent, Minn., in 1888; —34° at La Crosse, Wis., in 1875; —32° at Huron, S. Dak., in 1888; —55° at Fort Assiniboine, Mont., in 1887; —54° at Fort Washakie, Wyo., in 1883; —22° at Denver, Colo., in 1883; —4° at Fort Sill, Ind. T., in 1883; —11° at Whipple Barracks, (Prescott) Ariz., in 1880; —20° at Winnemucca, Nev., in 1883; —34° at Fort Klamath, Oregon, in 1884; —14° at Fort Canby, Wash., in 1887; 21° at Sacramento, Cal., in 1884; and 27° at Fresno, Cal., in 1889.

### LIMITS OF FREEZING WEATHER.

The southern limit of freezing weather for February, 1890, is shown on chart iv by a line traced from the coast of North Carolina, near Kitty Hawk, southwestward to Wilmington, N. C., thence west-southwest to southeastern Mississippi, thence northward to Vicksburg, Miss., and thence southwest to the Rio Grande Valley between Rio Grande City and Brownsville, Tex. The western limit of freezing weather is shown by a line traced from the Pacific coast, in about latitude north 39°, east of south over the San Joaquin Valley to the thirty-fifth parallel, and thence southeastward to the lower Gila valley. Compared with the limits of freezing weather for January, 1890, the line showing the southern limit of freezing weather for the current month averages from one to two degrees farther north over the south Atlantic and Gulf states. On the Pacific coast the line of freezing weather is farther east than for the preceding month.

### RANGES OF TEMPERATURE.

The greatest and least daily ranges of temperature at regular stations of the Signal Service are given in the table of miscellaneous meteorological data. The greatest monthly ranges of temperature occurred in central Montana, where they exceeded 100°, whence they decreased eastward to western lower Michigan, where they were less than 40°, and thence increased to northwestern New England, where they were more than 60°. From Montana the monthly ranges decreased southeastward to less than 20° over southern Florida, and to less than 50° on the west Gulf coast; southwestward to less than 40° on the coast of extreme southern California, and to less than 30° on the central coast of California; and westward to less than 40° on the north Pacific coast.

The following are some of the extreme monthly ranges:

| Greatest. | ° | Least. | ° |
|---|---|---|---|
| Fort Maginnis, Mont | 103.0 | Key West, Fla | 15.0 |
| Colorado Springs, Colo | 89.0 | San Francisco, Cal | 28.0 |
| Fort Reno, Ind. T | 82.0 | Neah Bay, Wash | 31.0 |
| Winnemucca, Nev | 79.0 | San Diego, Cal | 39.0 |
| Northfield, Vt | 63.0 | Galveston, Tex | 41.0 |

### FROST.

A cold wave of unusual severity for the season swept over the Gulf States during the 27th and 28th, attended by frost which greatly damaged spring vegetation, crops, and fruit blossoms in Alabama, Mississippi, Louisiana, and Texas, as far as the Gulf coast. No frost was reported during the month along the Atlantic coast south of the thirty-fourth parallel, in the southern half of Georgia, nor in Florida. The last killing frost generally occurs along the immediate Gulf coast from February 1st to 15th; the occurrence of damaging frost in the regions referred to in the current month was, therefore, two to four weeks later than usual. Compared with the preceding month the southern limit of frost was about three degrees farther north in the south Atlantic states and about two degrees farther south in Texas for February, 1890, while on the central and west Gulf coasts, and thence to the Pacific coast, the southern limit extended to the extreme southern boundary of the country in each month, except in Texas, where it was reported as far south as the lower Rio Grande valley in February only.

In the south Atlantic and Gulf states frost was reported most frequently in North Carolina, where it was noted for eighteen dates; in Louisiana for eleven dates; in Alabama and Mississippi for nine dates; in Texas for eight dates; in South Carolina for six dates; and in Georgia for four dates. On the Pacific coast frost was noted in California for twenty-six dates; in Oregon for twenty-three dates; and in Washington for five dates. In the south Atlantic and Gulf states frost was reported in seven states on the 9th and 10th; in six on the 8th and 16th; in five on the 28th; in four on the 11th, 12th, and 15th; in three on the 7th, 13th, 21st, 22d, and 27th; in two on the 14th; and in one on the 1st, 2d, 3d, 17th, 18th, and 23d. On the 4th, 5th, 6th, 24th, 25th, and 26th no frost was reported in the south Atlantic and Gulf states. In California frost was reported on the 1st, 3d, 4th, 5th, and 7th to 28th; in Oregon on the 6th to 28th; and in Washington on the 19th to 22d, and 26th.

### TEMPERATURE OF WATER.

The following table shows the maximum, minimum, and mean water temperature as observed at the harbors of the several stations; the monthly range of water temperature; and the mean temperature of the air for February, 1890:

| Stations. | Temperature at bottom. | | | | Mean temperature of air at the station. |
|---|---|---|---|---|---|
| | Max. | Min. | Range. | Monthly mean. | |
| | ° | ° | ° | ° | ° |
| Boston, Mass | 40.0 | 33.0 | 7.0 | 36.1 | 33.2 |
| Canby, Fort, Wash | 45.3 | 38.0 | 7.3 | 42.6 | 38.8 |
| Cedar Keys, Fla | 72.6 | 53.6 | 19.0 | 67.1 | 65.5 |
| Charleston, S. C | 63.2 | 55.0 | 8.2 | 58.6 | 60.6 |
| Eastport, Me | 36.5 | 34.3 | 2.2 | 35.1 | 23.4 |
| Galveston, Tex | 72.5 | 57.8 | 14.7 | 65.9 | 63.7 |
| Key West, Fla | 76.0 | 72.1 | 3.9 | 74.3 | 73.3 |
| Nantucket, Mass * | 41.0 | 31.5 | 9.5 | 38.0 | 35.6 |
| Portland, Oregon † | 44.4 | 37.5 | 6.9 | 40.5 | 38.5 |

* For 22 days only. † For 18 days only.

## PRECIPITATION (expressed in inches and hundredths).

The distribution of precipitation over the United States and Canada for February, 1890, as determined from the reports of nearly 2,000 stations, is exhibited on chart iii. In the table of miscellaneous meteorological data the total precipitation and the departure from the normal are given for each Signal Service station. The figures opposite the names of the geographical districts in the columns for precipitation and departure from the normal show, respectively, the averages for the several districts. The normal for any district may be found by adding the departure to the current mean when the precipitation is below the normal and subtracting when above.

The heaviest monthly precipitation reported for February, 1890, was 23.68, at Ellensburgh, Oregon; the monthly precipitation exceeded twenty inches at Delta and Upper Mattole, Cal., and exceeded ten inches in northwestern California, in eastern California between the thirty-eighth and thirty-ninth parallels, along and near the western coast of Oregon, in central Arkansas, central Mississippi, northeastern Alabama, northwestern Georgia, central and southwestern Tennessee, southwestern Kentucky, southwestern Indiana, and extreme western North Carolina. In the northern part of the Panhandle of Texas and thence westward over northeastern New Mexico, and in south-central New Mexico and extreme western Texas, no precipitation was reported, and in central and southeastern Arizona, southeastern California, west-central and southwestern Nevada, west-central Wyoming, southern and northeastern New Mexico, Texas west of the one-hundredth meridian, western Indian Territory, generally over Kansas and Nebraska, eastern and southeastern Colorado, eastern Montana, North Dakota, except in areas in the eastern part, in areas in South Dakota, northwestern Iowa, southwestern Missouri, west-central and southwestern Minnesota, northeastern Florida, east-central Georgia, east-central Virginia, and southwestern West Virginia, less than one-half inch of precipitation was reported.

The precipitation was in excess of the average for the month in the Saint Lawrence Valley, and thence southwestward over northern New England, the lower lake region, the middle Atlantic states, save at immediate coast stations, and in the Ohio Valley, Tennessee, and northern Arkansas; it was also generally in excess of the average in the upper lake region, the middle and northern plateau regions, in Oregon, and along the middle Pacific coast; elsewhere the precipitation for the month was generally deficient. The greatest departures above the average precipitation occurred in north-central Tennessee, where they amounted to nearly six inches, in west-central Oregon, where they exceeded four inches, at Roseburgh and Eola, and five inches at Albany, and in southern Indiana, extreme southern Illinois, generally in Tennessee, in extreme north-central upper Michigan, and in northwestern Oregon, where they exceeded three inches. The greatest departure below the average precipitation reported was 4.32, at Block Island, R. I., and the departures below the average exceeded two inches on the North Carolina coast, and thence southwestward along the coast to northern Florida, and thence westward along the Gulf coast to southern Louisiana; the deficiencies also exceeded two inches in central Illinois, extreme southeastern Arizona, extreme northwestern Washington, and at Los Angeles, Cal. Considered by districts the average percentages of precipitation as compared with the normal amount for the month were about as follows: northern plateau region, 169 per cent.; middle plateau region, 165 per cent.; Ohio Valley and Tennessee, 161 per cent.; upper lake region, 124 per cent.; lower lake region and middle Pacific coast, 122 per cent.; west Gulf states, 111 per cent. In districts where the precipitation was deficient the percentages of the normal were about as follows: middle-eastern slope of the Rocky Mountains, 42 per cent.; extreme northwest, 48 per cent.; south Pacific coast, 49 per cent.; Missouri Valley, 50 per cent.; south Atlantic states, 53 per cent.; Florida Peninsula, 63 per cent.; east Gulf states, 64 per cent.; Rio Grande Valley, and southeastern slope of the Rocky Mountains, 67 per cent.; New England, 72 per cent.; southern plateau region, 78 per cent.; north Pacific coast, 87 per cent.; northeastern slope of the Rocky Mountains, 88 per cent.; upper Mississippi valley, 92 per cent.; and middle Atlantic states, 94 per cent. The statement of percentages shows that the greatest average excesses in precipitation occurred in the Ohio Valley and Tennessee and in the middle and northern plateau regions, where it was more than one-half greater than the average, and that the most marked deficiencies occurred in the extreme northwest, the Missouri Valley, the middle-eastern slope of the Rocky Mountains, and on the south Pacific coast, where the precipitation was less than one-half the usual amount for February.

The table of miscellaneous meteorological data shows that at Palestine, Tex., Marquette, Mich., Valentine, Nebr., Montrose, Colo., Astoria and Roseburgh, Oregon, the precipitation was the greatest, and that at Wilmington, N. C., Pensacola, Fla., Fort Yates, N. Dak., Colorado Springs, Colo., Concordia, Kans., Ft. Reno, Ind. T., Fort Stanton and Lava, N. Mex., Fort Bowie and Wilcox, Ariz., it was the least reported for February during the respective periods of observation, and the table of deviations from average precipitation at certain stations as reported by voluntary observers shows that at Milan, Tenn., six years record, the precipitation for the current month was the greatest noted for February at that place for the period named.

For the period January 1 to February 28, 1890, inclusive, the excesses in precipitation have been greatest in the middle plateau region, where 196 per cent. of the normal precipitation has fallen; in the Ohio Valley and Tennessee the average for the period named has been 155 per cent. of the normal; for the middle Pacific coast, 143 per cent.; for the middle-eastern slope of the Rocky Mountains, 142 per cent.; for the upper Mississippi valley, 139 per cent.; for the south Pacific coast, 137 per cent.; for the lower lake region, 135 per cent.; for the upper lake region, 133 per cent.; for the northern plateau region, 127 per cent.; for the southern plateau region, 124 per cent.; for the west Gulf states, 121 per cent.; for the north Pacific coast, 103 per cent.; and for the southeastern slope of the Rocky Mountains, 101 per cent. The greatest deficiencies in precipitation for the period given have occurred in the south Atlantic states, where but 37 per cent. of the usual precipitation has been reported; in the Florida Peninsula the average has been 40 per cent. of the normal; in the east Gulf states, 51 per cent.; on the northeastern slope of the Rocky Mountains, 65 per cent.; in New England, 69 per cent.; in the middle Atlantic states, 70 per cent.; in the Rio Grande Valley, 71 per cent.; in the extreme northwest, 78 per cent.; and in the Missouri Valley, 86 per cent.

### DEVIATIONS FROM AVERAGE PRECIPITATION.

The following table shows for certain stations, as reported by voluntary observers, (1) the average precipitation for February for a series of years; (2) the length of record during which the observations have been taken and from which the average has been computed; (3) the total precipitation for February, 1890; (4) the departure of the current month from the average; (5) and the extreme monthly precipitation for February during the period of observation and the years of occurrence:

| State and station. | County. | (1) Average for the month of Feb. | (2) Length of record. | (3) Total for Feb., 1890. | (4) Departure from average. | (5) Extreme monthly precipitation for February. | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Greatest. | | Least. | |
| | | | | | | Am't. | Year. | Am't. | Year. |
| *Arkansas.* | | *Inches* | *Years* | *Inches* | *Inches.* | *Inches* | | *Inches.* | |
| Lead Hill..... | Boone..... | 5.12 | 8 | 5.32 | +0.20 | 10.93 | 1884 | 1.47 | 1885 |
| *California.* | | | | | | | | | |
| Sacramento..... | Sacramento. | 2.75 | 40 | 4.02 | +1.27 | 8.50 | 1854 | 0.12 | 1852 |
| *Connecticut.* | | | | | | | | | |
| Middletown..... | Middlesex... | 4.02 | 27 | 3.28 | —0.74 | 7.56 | 1887 | 1.14 | 1877 |

*Deviations from average precipitation*—Continued.

| State and station. | County. | (1) Average for the month of Feb. | (2) Length of record. | (3) Total for Feb., 1890. | (4) Departure from average. | (5) Extreme monthly precipitation for February. | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Greatest. | | Least. | |
| | | | | | | Am't. | Year. | Am't. | Year. |
| *Florida.* | | *Inches* | *Years* | *Inches* | *Inches.* | *Inches* | | *Inches.* | |
| Merritt's Island | Brevard | 2.95 | 12 | 1.15 | −1.80 | 6.01 | 1888 | 0.15 | 1882 |
| *Georgia.* | | | | | | | | | |
| Forsyth | Monroe | 4.36 | 16 | 4.39 | +0.03 | 7.90 | 1882 | 1.19 | 1879 |
| *Illinois.* | | | | | | | | | |
| Peoria | Peoria | 2.07 | 34 | 1.36 | −0.71 | 5.45 | 1887 | 0.06 | 1877 |
| Riley | McHenry | 2.09 | 39 | 1.52 | −0.57 | 6.00 | 1862–65 | 0.03 | 1877 |
| *Indiana.* | | | | | | | | | |
| Logansport | Cass | 3.95 | 14 | 2.53 | −1.42 | 9.01 | 1857 | 0.15 | 1868 |
| Vevay | Switzerland | 2.64 | 24 | 6.06 | +3.42 | 10.23 | 1884 | 0.40 | 1877 |
| *Iowa.* | | | | | | | | | |
| Cresco | Howard | 0.99 | 18 | 0.81 | −0.18 | 1.88 | 1887 | 0.07 | 1877 |
| Monticello | Jones | 1.89 | 37 | 0.98 | −0.91 | 4.62 | 1887 | 0.32 | 1877 |
| Logan | Harrison | 1.36 | 22 | 1.10 | −0.26 | 5.30 | 1881 | T. | 1889 |
| *Kansas.* | | | | | | | | | |
| Lawrence | Douglas | 1.27 | 24 | 0.75 | −0.52 | 4.60 | 1881 | 0.03 | 1870 |
| Wellington | Sumner | 1.11 | 11 | 0.45 | −0.66 | 3.73 | 1883 | 0.15 | 1879 |
| *Louisiana.* | | | | | | | | | |
| Grand Coteau | St. Landry | 2.80 | 7 | 3.85 | +1.05 | 7.44 | 1888 | 1.37 | 1886 |
| *Maine.* | | | | | | | | | |
| Gardiner | Kennebec | 3.52 | 50 | 3.78 | +0.26 | 9.47 | 1853 | 0.58 | 1877 |
| *Maryland.* | | | | | | | | | |
| Cumberland | Allegany | 2.46 | 17 | 4.24 | +1.78 | 4.92 | 1882 | 0.60 | 1877 |
| *Massachusetts.* | | | | | | | | | |
| Amherst | Hampshire | 3.16 | 55 | 3.08 | −0.08 | 6.69 | 1853 | 0.36 | 1877 |
| Newburyport | Essex | 4.52 | 10 | 4.27 | −0.25 | 6.75 | 1886 | 2.30 | 1889 |
| Somerset | Bristol | 3.81 | 16 | 2.93 | −0.88 | 8.70 | 1886 | 1.00 | 1877 |
| *Michigan.* | | | | | | | | | |
| Kalamazoo | Kalamazoo | 2.72 | 14 | 1.53 | −1.19 | 5.44 | 1881 | 0.12 | 1877 |
| Thornville | Lapeer | 2.07 | 13 | 1.66 | −0.41 | 4.08 | 1884 | 0.00 | 1877 |
| *Minnesota.* | | | | | | | | | |
| Minneapolis | Hennepin | 1.15 | 24 | 1.28 | +0.13 | 2.80 | 1869 | T. | 1877 |
| *Montana.* | | | | | | | | | |
| Fort Shaw | Lewis&Clarke | 0.41 | 20 | 0.43 | +0.02 | 1.04 | 1886 | 0.05 | 1877 |
| *New Hampshire.* | | | | | | | | | |
| Concord | Merrimac | 2.35 | 45 | 2.75 | +0.40 | 7.67 | 1887 | 0.50 | 1865 |
| *New Jersey.* | | | | | | | | | |
| Moorestown | Burlington | 3.46 | 26 | 3.62 | +0.16 | 6.02 | 1886 | 0.53 | 1877 |
| South Orange | Essex | 3.70 | 19 | 5.32 | +1.62 | 6.10 | 1881 | 1.10 | 1877 |
| *New York.* | | | | | | | | | |
| Cooperstown | Otsego | 2.14 | 36 | 2.91 | +0.77 | 5.21 | 1887 | 0.60 | 1856 |
| Palermo | Oswego | 2.85 | 36 | 2.62 | −0.23 | 7.20 | 1866 | 0.10 | 1877 |
| *North Carolina.* | | | | | | | | | |
| Lenoir | Caldwell | 4.19 | 18 | 5.70 | +1.51 | 9.00 | 1873 | 0.60 | 1877 |
| *Ohio.* | | | | | | | | | |
| N. Lewisburgh | Champaign | 3.10 | 18 | 5.95 | +2.85 | 8.20 | 1883 | 0.35 | 1872 |
| Wauseon | Fulton | 2.93 | 16 | 3.43 | +0.50 | 7.19 | 1887 | 0.12 | 1877 |
| *Oregon.* | | | | | | | | | |
| Albany | Linn | 6.03 | 12 | 11.18 | +5.15 | 13.08 | 1881 | 0.95 | 1889 |
| Eola | Polk | 5.33 | 20 | 9.48 | +4.15 | 13.24 | 1872 | 0.35 | 1889 |
| *Pennsylvania.* | | | | | | | | | |
| Dyberry | Wayne | 2.66 | 24 | 3.74 | +1.08 | 5.59 | 1884 | 0.60 | 1877 |
| Grampian Hills | Clearfield | 3.35 | 18 | 5.52 | +2.17 | 7.62 | 1887 | 1.56 | 1872 |
| Wellsborough | Tioga | 6.23 | 10 | 2.28 | −3.95 | 10.93 | 1884 | 0.95 | 1887 |
| *South Carolina.* | | | | | | | | | |
| Statesburgh | Sumter | 2.85 | 8 | 1.65 | −1.20 | 5.47 | 1889 | 1.18 | 1883 |
| *Tennessee.* | | | | | | | | | |
| Austin | Wilson | 5.30 | 21 | 9.13 | +3.83 | 12.57 | 1887 | 0.75 | 1868 |
| Milan | Gibson | 4.45 | 6 | 8.14 | +3.69 | 8.14 | 1890 | 1.31 | 1889 |
| *Texas.* | | | | | | | | | |
| New Ulm | Austin | 4.43 | 17 | 3.09 | −1.34 | 10.90 | 1882 | 1.06 | 1885 |
| *Vermont.* | | | | | | | | | |
| Strafford | Orange | 2.79 | 16 | 4.40 | +1.61 | 5.90 | 1887 | 0.30 | 1877 |
| *Virginia.* | | | | | | | | | |
| Birdsnest | Northampton | 3.55 | 21 | 1.90 | −1.65 | 6.55 | 1884 | 1.40 | 1877 |
| *Wisconsin.* | | | | | | | | | |
| Madison | Dane | 1.72 | 25 | 2.01 | +0.29 | 7.90 | 1869 | 0.30 | 1877 |
| *Washington.* | | | | | | | | | |
| Fort Townsend | Jefferson | 1.81 | 15 | 1.91 | +0.10 | 3.94 | 1879 | 0.37 | 1886 |

## EXCESSIVE PRECIPITATION.

The table of excessive precipitation shows that monthly precipitation to equal or exceed ten inches was reported at ten stations in California and Tennessee; at six stations in Oregon; at five stations in Kentucky; at four stations in Mississippi; at three stations in Arkansas; at two stations in Alabama; and at one station in Georgia, Indiana, North Carolina, and Texas. Among the heavier monthly rainfalls reported were, 23.68, at Ellensburgh, Oregon; 21.11, at Delta, Cal.; 20.36, at Upper Mattole, Cal.; 15.75, at Lawrenceburgh, Tenn.; and 13.33, at Burnside, Ky.

In February of preceding years precipitation to equal or exceed ten inches has been reported for sixteen years in California and Oregon; for fourteen years in Washington; for eleven years in Alabama; for from five to ten years, inclusive, in Florida, Georgia, Indiana, Mississippi, New York, North Carolina, Tennessee, and Texas; and for from one to four years, inclusive, in Arkansas, Connecticut, Illinois, Indian Territory, Iowa, Kansas, Kentucky, Louisiana, Massachusetts, Michigan, New Hampshire, New Mexico, Ohio, Pennsylvania, Rhode Island, South Carolina, and Virginia. In states and territories other than those named, precipitation to equal or exceed ten inches has not been reported for February of preceding years. The following are among the more notable heavy rainfalls for February of preceding years: Cisco and Summit, Cal., 22.85 and 20.70, respectively, in 1887; Cape Charles Light House, Va., 21.90, in 1868. Exclusive of the instances and years cited, precipitation to equal or exceed fifteen inches in February has been reported for four years in California; for three years in Oregon and Washington; and for one year in Georgia, Indiana, Louisiana, New York, North Carolina, South Carolina, Tennessee, and Texas.

For the current month precipitation to equal or exceed 2.50 inches in twenty-four hours was reported at twenty-one stations in Mississippi, and on seven dates, the 7th, 8th, 20th, 25th, and 26th to 28th; in Tennessee at nineteen stations, and on six dates, the 7th, 8th, and 25th to 28th; in Oregon at ten stations, and on three dates, the 1st, 2d, and 3d; in Indiana at seven stations, and on four dates, the 21st, and 24th to 26th; in California at six stations, and on two dates, the 3d and 4th; in Alabama at five stations, and on four dates, the 7th, and 25th to 27th; in Kentucky at five stations, and on three dates, the 23d, 24th, and 25th; in Arkansas at four stations, and on three dates, the 7th, 25th, and 27th; in Louisiana at four stations on the 7th; in Illinois at three stations, and on two dates, the 25th and 26th; in Arizona at two stations, and on two dates, the 20th and 21st; in Texas at two stations, and on four dates, the 7th, 13th, 26th, and 27th; in Georgia at one station on the 27–28th; in Maryland at one station on the 7–8th; in Missouri at one station on the 7th; in New York at one station on the 7–8th; in North Carolina at one station on the 25th; and in Washington at one station on the 2d. The following are among the heavier rainfalls reported for the period named: Ellensburgh, Oregon, 6.18 on the 1st; Longview, Tex., 6.00 on the 26th; Rienzi, Miss., 5.77 on the 7th; Lawrenceburgh, Tenn., 5.50 on the 27th; Upper Mattole, Cal., 5.17 on the 4th; Chataignier, La., 5.00 on the 7th; Columbiana, Ala., 4.90 on the 26th; Bowling Green, Ky., 3.81 on the 24th; and Newport, Ark., 3.69 on the 25th.

For February of preceding years precipitation to equal or exceed 2.50 inches in twenty-four hours has been reported for ten years in Alabama and Texas; for from five to nine years, inclusive, in Arkansas, Connecticut, Florida, Georgia, Illinois, Louisiana, Mississippi, New York, North Carolina, Tennessee; and in from one to four years, inclusive, in California, Dakota, Delaware, Indiana, Iowa, Kansas, Kentucky, Maine, Maryland, Massachusetts, Michigan, Missouri, New Jersey, Ohio, Oregon, Pennsylvania, Rhode Island, South Carolina, Virginia, Washington, and Wisconsin. In states and territories other than those named precipitation to equal or exceed 2.50 inches in twenty-four hours has not been reported for February of preceding years. The heaviest February rainfall reported in preceding years for the period given was, 10.10, at Oneida, N. Y., 13th, 1874. In Louisiana and Tennessee rainfall to equal or exceed five inches in twenty-four hours has been reported for two years; and in Connecticut and Virginia for one year.

For the current month precipitation to equal or exceed one inch in one hour was reported as follows: 1.93, in thirty minutes, at Louisville, Miss., on the 26th; 1.02, in thirty minutes, at Livingston, Ala., on the 24th; 1.04, in forty minutes, at Hatteras, N. C., on the 8th; 1.17, in one hour, at Indiana, Pa., on the 20th; 3.00, at Lawrenceburgh, Tenn., on the 26th; and 2.48, in two hours, at Vidalia, La., on the 27th.

In February of preceding years precipitation to equal or exceed one inch in one hour has been reported for four years in Tennessee; for three years in Mississippi, North Carolina, and Texas; for two years in Arkansas and California; and for one year in Alabama, Florida, Georgia, Kansas, and Michigan. In states and territories other than those named precipitation to equal or exceed one inch in one hour has not been reported for February of preceding years. The heaviest rainfalls re-

ported for this period in February of previous years are, 3.04, in fifty-five minutes, at Galveston, Tex., 27th, 1872, and 3.31, in one hour, at Galveston, Tex., 22d, 1888.

*Table of excessive precipitation, February, 1890.*

| State and station. | Monthly rainfall 10 inches, or more. | Rainfall 2.50 inches, or more, in 24 hours. | | Rainfall of 1 inch, or more, in one hour. | | |
|---|---|---|---|---|---|---|
| | | Amt. | Day. | Amt. | Time. | Day. |
| *Alabama.* | *Inches.* | *Inches.* | | *Inches* | *h. m.* | |
| Columbiana | | 4.90 | 26 | | | |
| Double Springs | 11.42 | 3.20 | 7 | | | |
| Do | | 3.00 | 27 | | | |
| Livingston (1) | | 2.81 | 7 | 1.02 | 0 30 | 24 |
| Valley Head | 11.61 | 3.10 | 26 | | | |
| Do | | 4.50 | 27 | | | |
| Wiggins | | 3.06 | 25-26 | | | |
| *Arizona.* | | | | | | |
| Tip Top | | 3.00 | 20 | | | |
| Walnut Grove | | 3.70 | 20-21 | | | |
| *Arkansas.* | | | | | | |
| Conway | 11.08 | | | | | |
| Dardanelle | 10.23 | 3.50 | 25 | | | |
| Forrest City | | 3.00 | 27 | | | |
| Helena (1) | | 2.98 | 7 | | | |
| Newport (1) | 12.59 | 3.69 | 25 | | | |
| *California.* | | | | | | |
| Arcata | 14.78 | 4.93 | 3 | | | |
| Do | | 2.94 | 4 | | | |
| Boulder Creek | 10.62 | | | | | |
| Delta | 21.11 | | | | | |
| Eureka | 13.88 | 4.91 | 3 | | | |
| Ferndale | 10.77 | 3.15 | 4 | | | |
| Fort Gaston | 15.58 | | | | | |
| Hydesville | 10.13 | 2.50 | 3 | | | |
| Sims | 18.30 | | | | | |
| Sonoma | 12.87 | | | | | |
| Upper Mattole | 20.36 | 4.50 | 3 | | | |
| Do | | 5.17 | 4 | | | |
| Walla Walla Creek | | 2.62 | 3 | | | |
| *Georgia.* | | | | | | |
| Diamond | 10.75 | 2.75 | 27-28 | | | |
| *Illinois.* | | | | | | |
| Golconda | | 2.74 | 25-26 | | | |
| Grand Tower | | 3.00 | 25 | | | |
| Mount Carmel | | 2.60 | 25 | | | |
| *Indiana.* | | | | | | |
| Columbus | | 2.85 | 25 | | | |
| De Gonia Springs | | 2.50 | 25 | | | |
| Huntingburgh | 12.12 | 2.50 | 21 | | | |
| Marengo | | 3.00 | 25 | | | |
| Mount Vernon (1) | | 2.87 | 26 | | | |
| Mount Vernon (2) | | 2.87 | 25 | | | |
| Princeton | | 2.95 | 24-25 | | | |
| Vincennes | | 2.95 | 25 | | | |
| *Kentucky.* | | | | | | |
| Bowling Green | 12.50 | 3.81 | 24 | | | |
| Burnside | 13.33 | 3.25 | 25 | | | |
| Greensburgh | 12.35 | 3.43 | 24 | | | |
| Murray | 12.46 | 2.98 | 23 | | | |
| Do | | 2.65 | 24 | | | |
| Princeton | 10.77 | 2.70 | 25 | | | |
| *Louisiana.* | | | | | | |
| Chataignier | | 5.00 | 7 | | | |
| Clinton | | 3.65 | 7 | | | |
| Melville | | 3.05 | 7 | | | |
| Vidalia | | 3.16 | 7 | 2.48 | 2 00 | 27 |
| *Maryland.* | | | | | | |
| Jewell | | 2.50 | 7-8 | | | |
| *Mississippi.* | | | | | | |
| Agricultural College | | 2.50 | 7 | | | |
| Batesville | | 2.60 | 7 | | | |
| Booneville | 11.23 | 5.70 | 7 | | | |
| Do | | 3.07 | 28 | | | |
| Canton | | 2.98 | 27 | | | |
| Columbus | | 3.15 | 7 | | | |
| Edwards | | 2.70 | 7 | | | |
| Fayette | | 2.65 | 7 | | | |
| Holly Springs | | 3.00 | 7 | | | |
| Do | | 2.62 | 27 | | | |
| Jackson | 10.50 | 3.70 | 7 | | | |
| Do | | 3.10 | 25 | | | |
| Kosciusko | | 2.60 | 7 | | | |
| Do | | 2.50 | 26 | | | |
| Lake | | 3.00 | 7 | | | |
| Louisville | | 3.37 | 7 | 1.93 | 0 30 | 26 |
| Do | | 2.61 | 26 | | | |
| Meridian | | 2.94 | 7-8 | | | |
| Natchez | | 2.50 | 27 | | | |
| Okalona | | 3.20 | 7 | | | |
| Palo Alto | | 2.57 | 7 | | | |
| Rienzi | 12.11 | 5.77 | 7 | | | |
| Do | | 3.78 | 27 | | | |
| University | | 2.70 | 7 | | | |
| Valden | 10.41 | 4.07 | 20 | | | |
| Washington | | 3.05 | 7 | | | |
| Waynesboro' (1) | | 3.00 | 27 | | | |
| *Missouri.* | | | | | | |
| New Haven | | 3.00 | 7 | | | |
| *New York.* | | | | | | |
| Potsdam | | 4.00 | 7-8 | | | |
| *North Carolina.* | | | | | | |
| Hatteras | | | | 1.04 | 0 40 | 8 |
| Highlands | | 3.00 | 25 | | | |
| Murphy | 10.48 | | | | | |

*Table of excessive precipitation*—Continued.

| State and station. | Monthly rainfall 10 inches, or more. | Rainfall 2.50 inches, or more, in 24 hours. | | Rainfall of 1 inch, or more, in one hour. | | |
|---|---|---|---|---|---|---|
| | | Amt. | Day. | Amt. | Time. | Day. |
| *Oregon.* | *Inches.* | *Inches.* | | *Inches* | *h. m.* | |
| Albany | 11.18 | 4.50 | 1 | | | |
| Do | | 3.00 | 2 | | | |
| Astoria | 11.48 | 3.24 | 1 | | | |
| Bandon | | 2.55 | 3 | | | |
| Ellensburgh | 23.68 | 6.18 | 1 | | | |
| Do | | 6.12 | 2 | | | |
| Do | | 4.25 | 3 | | | |
| Eola | | 5.30 | 1 | | | |
| Grant's Pass | 10.12 | 2.54 | 3 | | | |
| McMinnville | | 4.67 | 1-2 | | | |
| Mount Angel | | 2.85 | 2 | | | |
| Portland | | 3.81 | 1-2 | | | |
| Siskiyou | 14.40 | | | | | |
| Tillamook | 14.10 | 4.17 | 1 | | | |
| Do | | 2.58 | 2 | | | |
| *Pennsylvania.* | | | | | | |
| Indiana | | | | 1.17 | 1 00 | 20 |
| *Tennessee.* | | | | | | |
| Arlington | 11.20 | 2.50 | 25 | | | |
| Ashwood | 10.34 | | | | | |
| Clarksville | | 2.61 | 25 | | | |
| Cog Hill | | 3.50 | 25 | | | |
| Covington | 10.72 | | | | | |
| Dunlap | | 3.45 | 7 | | | |
| Fayetteville | | 2.78 | 8 | | | |
| Florence station | 10.96 | 2.76 | 25 | | | |
| Grand Junction | | 2.56 | 7 | | | |
| Do | | 3.60 | 27 | | | |
| Grief | | 3.50 | 27 | | | |
| Hohenwald | 11.43 | 4.14 | 7 | | | |
| Do | | 2.60 | 27 | | | |
| Kingston | 11.09 | | | | | |
| Kingston Springs | | 2.75 | 7 | | | |
| Lawrenceburgh | 15.75 | 2.50 | 25 | 3.00 | 2 00 | 26 |
| Do | | 3.00 | 28 | | | |
| Do | | 5.50 | 27 | | | |
| Nashville | 10.95 | 2.52 | 7-8 | | | |
| Nunnelly | | 2.53 | 7 | | | |
| Parksville | | 2.51 | 26 | | | |
| Riddleton | | 2.64 | 27 | | | |
| Rugby | 11.75 | 2.73 | 25 | | | |
| Do | | 3.30 | 8 | | | |
| Sharps | | 4.00 | 27 | | | |
| Watkins | 10.28 | 3.50 | 8 | | | |
| Waynesborough | | 4.00 | 7 | | | |
| *Texas.* | | | | | | |
| Columbia | | 2.70 | 7 | | | |
| Do | | 2.75 | 13 | | | |
| Longview | 12.85 | 6.00 | 26 | | | |
| Do | | 3.00 | 27 | | | |
| *Washington.* | | | | | | |
| Vancouver Barracks | | 3.60 | 2 | | | |

*Received too late for publication in January Review.*

| | | | | | | |
|---|---|---|---|---|---|---|
| *California.* | | | | | | |
| Arcata | 16.85 | 3.39 | 12 | | | |
| Delta | 17.18 | | | | | |
| Dunsmuir | 23.60 | | | | | |
| Glenn Ellen | 19.28 | | | | | |
| Vacaville | 11.74 | | | | | |
| Walla Walla Creek | 11.86 | | | | | |
| *Illinois.* | | | | | | |
| Palestine | 3.29 | 1 | | | | |
| Do | 3.00 | 5 | | | | |
| *Oregon.* | | | | | | |
| Bandon | 20.75 | 4.03 | 28 | | | |
| Ellensburgh | 31.84 | 3.56 | 15 | | | |
| Do | | 3.96 | 24 | | | |
| Do | | 4.89 | 24 | | | |
| Do | | 2.63 | 29 | | | |
| Grant's Pass | 13.88 | | | | | |
| Siskiyou | 12.80 | | | | | |
| Toledo | 20.60 | 2.62 | 28 | | | |
| Do | | 2.85 | 31 | | | |
| Tillamook | 19.55 | | | | | |
| *Utah.* | | | | | | |
| Alta | 12.00? | | | | | |

*Received too late for general discussion of weather, February, 1890.*

| | | | | | | |
|---|---|---|---|---|---|---|
| *Oregon.* | | | | | | |
| Corvallis | | 3.20 | 1-2 | | | |
| Creswell | | 3.01 | 1 | | | |
| Cascade Locks | 22.28 | 4.82 | 1 | | | |
| Do | | 5.88 | 2 | | | |
| Do | | 5.09 | 3 | | | |
| Gardiner | 14.33 | 3.61 | 1 | | | |
| Do | | 2.78 | 2 | | | |
| Hubbard | | 2.51 | 2 | | | |
| Hood River | | 2.58 | 1 | | | |
| Jacksonville | | 2.62 | 3 | | | |
| Tillamook | | 4.17 | 1 | | | |
| Toledo | 10.35 | 3.40 | 1 | | | |
| Vernonia | 10.04 | 2.78 | 1 | | | |
| *Texas.* | | | | | | |
| Gainesville | | 2.75 | 24 | | | |

### MAXIMUM RAINFALLS IN ONE HOUR OR LESS.

The following table is a record of the heaviest rainfalls during February, 1890, for periods of five and ten minutes and one hour, as reported by regular stations of the Signal Service furnished with self-registering gauges:

| Station. | Maximum fall in— | | | | | |
|---|---|---|---|---|---|---|
| | 5 min. | Date. | 10 min. | Date. | 1 hour. | Date. |
| | *Inch.* | | *Inch.* | | *Inch.* | |
| Bismarck, N. Dak* | | | | | | |
| Boston, Mass | 0.03 | 25 | 0.05 | 25 | 0.20 | 25 |
| Buffalo, N. Y | 0.05 | 20 | 0.05 | 20 | 0.15 | 8 |
| Cincinnati, Ohio | 0.18 | 19 | 0.25 | 19 | 0.40 | 19, 25 |
| Chicago, Ill* | | | | | | |
| Detroit, Mich | 0.03 | 25 | 0.05 | 25 | 0.15 | 25 |
| Galveston, Tex | 0.10 | 13 | 0.15 | 13 | 0.37 | 7 |
| Jupiter, Fla | 0.27 | 9 | 0.35 | 9 | 0.65 | 9 |
| Marquette, Mich* | | | | | | |
| New York City | 0.10 | 14 | 0.16 | 14 | 0.47 | 14 |
| New Orleans, La | 0.15 | 7 | 0.20 | 7 | 0.40 | 7 |
| Norfolk, Va | 0.11 | 14 | 0.20 | 14 | 0.52 | 14 |
| Savannah, Ga | 0.05 | 8 | 0.10 | 8 | 0.18 | 10 |
| San Francisco, Cal | 0.05 | 19 | 0.07 | 16, 19 | 0.31 | 16 |
| Saint Louis, Mo | † | | † | | 0.12 | 13 |
| Washington City | 0.05 | 8 | 0.10 | 8 | 0.35 | 8 |

* No record on account of snow. † Too small for gauge to record.

### SNOW (snowfall in inches and tenths.)

The greatest depth of snowfall was reported in Placer County, Cal., along the line of the Central Pacific Railroad crossing the summit of the Sierra Nevada Mountains, where one hundred and forty-nine inches fell at Cisco, and ninety-eight inches at Emigrant Gap. Eighty-nine inches were reported at Truckee, Nevada Co., Cal., and sixty-six inches at Lick Observatory, Mount Hamilton, Cal. Fifty inches or more of snowfall were reported at Boca and Colfax, Cal., and Marquette, Mich; from thirty to fifty inches in areas in west-central Colorado, northern and southeastern Idaho, northern upper Michigan, northern lower Michigan, northeastern Nevada, northern Utah, northwestern Wyoming, east-central and northeastern Wisconsin, and at Blue Knob, Pa.; from twenty to thirty inches in northeastern New Hampshire, south-central Vermont, central and northwestern New York, northeastern lower Michigan, extreme north-central New Mexico, central Arizona, and east-central Nevada; from ten to twenty inches in Maine, north-central and northeastern Massachusetts, extreme north-central Illinois, north-central and northeastern Iowa, southeastern Minnesota, northeastern Pennsylvania, central Virginia, western Maryland, central Missouri, north-central Nebraska, southwestern Montana, and northern and eastern Washington, eastern Oregon, and generally in Idaho. The southern limit of snow for February, 1890, is indicated by a line traced from the Atlantic coast in about latitude north 39° southwestward to northern Alabama, thence northwest to extreme western Kentucky, thence westward over southern Missouri and northeastern Arkansas, thence southwestward to central Texas, thence westward to south-central Arizona, and thence northwestward to the Pacific coast in about latitude north 40°. The great depth of snow in the deep cuts along the Central Pacific Railroad crossing the summit of the Sierra Nevada Mountains caused an intermittent and exceedingly difficult train service until the latter part of the month.

Snowfalls of ten inches or more were reported, as follows, and in states and territories where the maximum depth was below that amount, the station reporting the greatest is given: *Alabama.*—Double Springs, trace. *Arizona.*—Volunteer Springs, 22. *California.*—Cisco, 149; Summit, 116; Emigrant Gap, 98; Truckee, 89; Sisson, 76; Mount Hamilton, 66; Colfax, 56; Boca, 54; Susanville, 47; Sims, 32; Placerville, 18; Hornbrook, 17.5; Fort Bidwell, 14.6; El Dorado, 14; Delta, 13; Montague, 11; Auburn and Shingle Springs, 10.5. *Colorado.*—Aspen, 44; Rifle Falls, 28; Frazer, 25.5; Leadville, 18; Durango, 16; Emma, 14.2; Breckenridge, 14; T. S. Ranch, 11; Moraine, 10.8; Georgetown, 10.5; Boulder Canyon, 10. *Connecticut.*—Falls Village and Waterbury, 6. *District of Columbia.*—Washington City, 1.5. *Idaho.*—Fort Sherman, 43.2; Soda Springs, 35; Kootenai, 29; Era, 17; Boisé Barracks, 12; Boisé City, 11. *Illinois.*—Rockford, 17; Winnebago, 15; Rock Island Arsenal, 11.2; Cockrell, 11; Belvidere and Centralia, 10. *Indiana.*—Columbia City, 5.8. *Iowa.*—West Bend, 13.5; McCausland, 13; Le Claire, 12; Logan, 11; Independence, 10.8; Dubuque, Iowa City, and Muscatine, 10.5; Storm Lake, 10.2; Manson and Maquoketa, 10. *Kansas.*—Conway, 8.5. *Kentucky.*—Lexington, 7. *Maine.*—Belfast, 19; Bar Harbor, 17; Eastport, 16.9; Cornish, 16; Lewiston, 15; Calais and Orono, 13; Fairfield and Gardiner, 12; Portland, 10.9. *Maryland.*—Cumberland, 10.3. *Massachusetts.*—Fitchburgh and Groton, 10. *Michigan.*—Marquette, 54.3; Atlantic, 46; Bear Lake, 41; Calumet, 30.5; Traverse City, 30; Alpena, 29.9; Benzonia, 27.9; Gulliver Lake, 26.1; Caldwell, Hillman, and Roscommon, 26; Grayling, 25.5; Lathrop, 25; Manistee, 23; Ivan and Saint Ignace, 22; Weldon Creek, 21.9; Sault de Ste. Marie, 20.9; Fort Brady, 20.2; Mio, 20; Crystal Falls, 17.5; Charlevoix, 17; Harrisville, 16.1; Hart, 15; West Branch, 14.4; Stanton, 14.4; Big Rapids and Harrison, 14; Ionia, 13; East Tawas, 12.6; Gladwin, 12; Otsego, 10.5; Chase, 10. *Minnesota.*—Minneapolis, 11.2; Duluth, 10.9. *Missouri.*—Columbia, 9.8. *Montana.*—Virginia City, 16. *Nebraska.*—Kennedy, 19; Valentine, 12.2. *Nevada.*—Fenelon, 34.5; Carson City, 26.9; Toano, 18; Reno, 17.5; Wells, 15.1; Browns and Carlin, 14; Tecoma, 13; Palisade, 12.5; Humboldt, 11.5; Beowawe, 10. *New Hampshire.*—Berlin Mills, 27; Plymouth, 21; Manchester *a*, 16.4; Manchester *b*, 16; West Milan, 15; North Sutton and Walpole, 14; Hanover *a*, 13.6; Hanover *b*, 13; Antrim and Concord, 12; Nashua and Newton, 11; East Canterbury, 10.8. *New Jersey.*—Locktown and South Orange, 2.2. *New Mexico.*—Chama, 29; Nogal, 18. *New York.*—Constableville, 24.5; Number Four, 23.2; Ogdensburgh, 20.5; Canton, 19.9; Ampersand, 19; Sherman, 17; Utica, 16.2; North Hammond, 15.5; Malone and Rochester, 14.8; Brookfield, 13.5; Lyons and Potsdam, 12.5; Queensbury, 11.2; Oswego, 10.4. *North Carolina.*—Hot Springs, trace. *North Dakota.*—Fort Yates, 5.6. *Ohio.*—Jefferson, 5.3. *Oregon.*—Siskiyou, 46; Joseph, 28.2; Heppner, 17; Baker City, 10.3. *Pennsylvania.*—Blue Knob, 31; Eagle's Mere, 13.5; Gettysburgh and Wellsborough, 11.5. *Rhode Island.*—Pawtucket and Providence, 4. *South Dakota.*—Spearfish, 8.2. *Tennessee.*—Rugby, 3.5. *Texas.*—Menardville, 12. *Utah.*—Ogden *a*, 34; Ogden *b*, 32; Losee, 24; Mount Pleasant and Salt Lake City, 18; Levan, 11.5; Corinne, 11; Alta, 10. *Vermont.*—Chelsea, 24; Strafford, 23; East Berkshire, 18.4; Jacksonville, 17; Hartland, 15; Northfield, 14.5; Lunenburgh, 12; Burlington, 11; Cornwall, 10. *Virginia.*—Woodstock, 10.5. *Washington.*—Spokane Falls, 17.9; Fort Walla Walla, 16.8; Blakeley, 16.5; Port Angeles, 11.5; Walla Walla, 10.8. *West Virginia.*—Tannery, 6.2. *Wisconsin.*—Manitowoc, 32.1; Green Bay, 30.2; Greenwood, 29.8; Embarrass, 27.8; Oshkosh, 27; Waucousta, 26; Summit Lake, 23.5; Milwaukee, 17.1; Glasgow and Neillsville, 16; Delavan, 13; Cadiz, 12; Lincoln, 11.9; Phillips, 10. *Wyoming.*—Camp Sheridan, 36.5; Carbon, 32.8; Saratoga, 32.5; Fort Bridger, 17.5; Lusk, 15.8; Camp Pilot Butte, 12.

### DEPTH OF SNOW ON GROUND AT CLOSE OF MONTH.

Chart iv shows the depth of snow reported on the ground at the close of the month. In New England snow was reported as far south as extreme northeastern Massachusetts, and a depth of ten to eleven inches was noted in southwestern Maine; in the middle Atlantic states trace of snow was reported at Dyberry, northeastern Pennsylvania, and two inches at Turin, central New York; in the Ohio valley trace was reported as far south as west-central Kentucky, and the greatest depth, about one-half inch, was reported at Indianapolis, Ind. West of the Mississippi River snow was reported on the ground north of a line traced from southern Missouri westward over southern Kansas, thence southwestward to central New Mexico, as far south as central Arizona, and on the Pacific coast as far south as Lick Observatory, Mount Hamilton, Cal. and in the

mountain regions in northeastern California. In west-central Colorado forty-eight inches were reported; at Lick Observatory, Cal., forty inches; in extreme northern upper Michigan, forty-six inches; in east-central and northeastern Wisconsin, thirty inches; in northern Utah, twenty inches; in southeastern Wyoming more than twenty inches; and in parts of northern Illinois, northeastern, eastern, and northern Iowa, northern Minnesota, North Dakota, and Montana, more than five inches. Compared with the preceding month the southern limit of snow on the ground at the close of the respective months was somewhat farther south in the central valleys and in the Rocky Mountain and plateau regions at the end of February.

### HAIL.

Descriptions of the more severe hail storms of the month are given under the head of "Local storms." Hail was reported as follows: 1st, Ind., Ky. 2d, Mo. 5th and 6th, Kans. 7th, Ill., La., Mass., Miss., N. J., N. Y., Pa., Tex. 9th, Oregon. 10th, Wash. 11th, Oregon. 13th, Tex. 14th, Mass., Pa., Wash. 15th, Oregon, Wash. 16th, Cal., Oregon. 17th, Cal., Ind., Mich., Pa. 18th, Cal., Ind., Mass., N. Y., Pa. 19th, Cal., Ill., Ind., Iowa, Mich., Mo., Nev., N. J., N. Y., Pa. 20th, Cal., Md., Mass., N. Y., Pa. 21st, Cal., Tex. 22d, Cal., S. C., Tenn. 23d, Cal., Ill., Mo., Oregon, Tenn., Tex. 24th, Ala., Ark., Ga., Ill., Ind., Ky., Miss., Mo., Ohio, Tenn., Tex. 25th, Ala., Ark., Cal., Ind., Iowa, Ky., Miss., Mo., N. Y., N. C., S. C., Tenn., Tex., Va. 26th, Ga., Kans., Ky., La., Miss., Mo., N. C., Tenn., Tex. 27th, Ala., Ill., Kans., La., Miss., Mo., Tex. 28th, Ill., Me., Nev., N. J., Tex.

### SLEET.

Sleet was reported as follows: 1st, Cal., Ill., Ind., Ky., Pa., Va. 2d, Conn., Mass., Pa. 3d, N. Y. 4th, Mich., Minn., N. Y., Vt. 5th, Ill., Mo., N. C., Tenn., Vt. 6th, Ill., Kans., Md. 7th, Ill., Ind., Kans., Minn., Mo., Nebr., N. J., N. C., Ohio, Pa., S. C., Tenn., Va. 8th, Me., Mass., N. Y., Pa., S. C., Tenn., Vt. 9th, Conn. 12th, Me., N. Y. 13th, Tex. 14th, N. Y., Wash. 15th, Oregon, Wash. 17th, Mass., Minn., N. Y., Pa. 18th, Conn., Mass., N. Y., Pa., Vt. 19th, Ill., Iowa, Mass., Mich., N. J., N. Y., Ohio, Pa., Va. 20th, Cal., Conn., N. Y., Pa. 21st, Cal., N. Mex. 22d, Cal., Ill., Ind., Kans., Mo., N. Y., N. C., S. C. 23d, D. C., N. C., Utah. 24th, Me., N. Mex., Oregon, Tenn. 25th, Ill., Kans., Mo., Tenn., Tex. 26th, Ill., Ind. T., Iowa, Kans., Mo., Tenn. 27th, Ariz., Ark., Ill., Ind. T., Iowa, Kans., Mo., N. Y., Tex. 28th, Ill., Ind., Me., Mich., Miss., N. J.

## WINDS.

The prevailing winds during February, 1890, are shown on chart ii by arrows flying with the wind. In New England and over the middle-eastern and northeastern slopes of the Rocky Mountains the winds were mostly from north to west; in the middle Atlantic states, from northeast to northwest; in the south Atlantic states, from south to southwest; in the east Gulf states and over the northern plateau region, from southeast to southwest; in the west Gulf states, southerly; in the upper Mississippi valley and over the middle plateau region, from northwest to southwest; in the Missouri valley and the extreme northwest, from north to northwest; over the southern plateau region and on the north Pacific coast, from south to west; on the south Pacific coast, northerly; and over the Florida Peninsula, in the Ohio valley and Tennessee, the upper and lower lake regions, over the southeastern slope of the Rocky Mountains, and on the middle Pacific coast, variable.

### HIGH WINDS (in miles per hour).

Maximum velocities of fifty miles, or more, per hour were reported at regular stations of the Signal Service as follows: 1st, 66, s., at Fort Canby, Wash. 3d, 70, s., at Fort Canby, Wash.; 50, sw., at North Platte, Nebr.; 50, sw., at Walla Walla, Wash. 4th, 64, nw., at Bismarck, N. Dak.; 72, nw., at Fort Buford, N. Dak.; 64, w., at Cheyenne, Wyo.; 52, sw., at Fort Custer, Mont.; 84, sw., at Fort McKinney, Wyo. 6th, 60, nw., at Fort Buford, N. Dak.; 51, sw., at Wood's Holl, Mass.; 60, w., at Helena, Mont. 7th, 62, nw., at Bismarck, N. Dak.; 52, s., at Fort Canby, Wash.; 60, se., at Erie, Pa. 8th, 59, w., at Buffalo, N. Y.; 53, se., at Wood's Holl, Mass.; 60, nw., at Hatteras, N. C. 10th, 53, n., at Pueblo, Colo. 12th, 50, s., at Fort Canby, Wash. 13th, 55, w., at Whipple Barracks (Prescott), Ariz. 15th, 50, nw., at Wood's Holl, Mass. 16th, 50, nw., at Wood's Holl, Mass.; 54, sw., at Winnemucca, Nev.; 52, s., at Whipple Barracks (Prescott), Ariz. 19th, 52, sw., at Whipple Barracks (Prescott), Ariz. 21st, 65, sw., at Whipple Barracks (Prescott), Ariz.; 60, nw., at Wood's Holl, Mass.; 54, nw., at Block Island, R. I. 23d, 50, w., at Cheyenne, Wyo. 25th, 60, se., at Lexington, Ky. 26th, 54, sw., at Fort Stanton, N. Mex. 28th, 58, w., at Buffalo, N. Y.

### LOCAL STORMS.

Destructive local storms were reported in Geneva county, Alabama, on the 7th, and in Talladega and Pickens counties, Alabama, and in Kemper county, Miss., on the 27th; a severe thunder-storm was reported at Meridian, Miss., on the 7th; a heavy hail-storm occurred at Livingston, Ala., and at Humboldt and Mason, Tenn., on the 24th; and unusually strong gales were reported at Fort Buford, N. Dak., on the 4th; at Helena, Mont., on the 6th; at points in the interior of southwestern Pennsylvania on the 7th; along the New Jersey coast from the 7th to 9th; at Lexington, Ky., Brownsville, Tenn., and Gainesville, Tex., on the 25th; at Paducah, Ky., Johnsonville, Tenn., and Marksville, La., on the 26th; at Shuqualak, Miss., on the 27th; and at Jackson, Miss., on the 28th. At Fort Buford, N. Dak., on the 4th, the wind attained an extreme velocity of ninety-six miles per hour, and the average velocity for four hours was fifty-one miles per hour. At Helena, Mont., the maximum velocity on the 6th, sixty miles per hour from the west, was the highest velocity recorded at that place since the establishment of the Signal Service station in 1879. Prof. M. L. Ray, Superintendent of Education of Geneva county, Alabama, makes the following report relative to a tornado which passed over that county on the 7th: "The first place where the storm did any damage was about one-half mile south of Eunola. From there it took a course about 20° east of north, uprooting and snapping off trees of all sizes. My dwelling being in the track, was entirely swept away, and all the other houses in the place were either totally destroyed or so badly damaged as to render them almost worthless. The storm continued its destructive course for about six miles. The path of the storm is not straight, but turns first one way and then another, and sometimes seems to reach out on either side like the teeth of a saw. When the tornado approached my house we had no time to get out of its way, and we seemed to be enveloped in a cloud of sparks just as the timbers thundered around us." On the 7th a thunder, rain, and hail storm passed over Meridian, Miss.; the storm was very severe at towns to the westward of that place, and numerous washouts were reported along the railroads. At Enterprise, Miss., hail fell to a depth of several inches. Destructive storms prevailed on the 7th in Fayette, Centre, and Cambria counties, Pennsylvania. A severe storm prevailed along the New Jersey coast from the 7th to 9th, causing high tides and doing considerable damage to property. On the 18th a thunder-storm, accompanied by vivid lightning, snow, hail, and sleet, occurred at Boston, Mass., from 10.04 to 10.20 p. m. On the 24th a severe rain and hail storm occurred at Livingston, Ala.; 1.02 inch of rain fell from 3.00 to 3.30 p. m., and for ten minutes of that time the largest hail-stones ever observed in that section fell. The larger hail-stones ranged in weight from one to two ounces,